DISCOVERY

57(311), November, 2021

To Cite:
Thapa S, Mandal RA, Mathema AB, Yadav Y. Bajrabarahi religious forest: a boon of rural income and visitor attraction. *Discovery*, 2021, 57(311), 749-756

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Peer-Review History
Received: 04 September 2021
Reviewed & Revised: 06/September/2021 to 11/October/2021
Accepted: 14 October 2021
Published: November 2021

Peer-Review Model
External peer-review was done through double-blind method.

Bajrabarahi religious forest: a boon of rural income and visitor attraction

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ABSTRACT

The religious forest is the handsome source of income but research related to this is limited so far in Nepal. Thus, this study was done to show the trend of income and expenditure flow of the forest from year 2012 to 2018. Along with it, this study also explores factors affecting the religious forest management in Lalitpur Nepal. Bajrabarahi religious forest was selected as the study site. Total 60 visitors and 10 Key informants including locals were interviewed. Two observation dated from 20 March to 25 March, 2021 was organized. Focus group discussion on 30 March and 2nd May, 2021 were done. Secondary data of income and expenditure of religious forest were collected from the record. The collected data were analyzed using economical and statistical analysis tools. The results showed that the highest income was US$ 7191.17 in year 2017/2018 which was the lowest US$ 4520.96 in year 2012/2013. Similarly, the highest expenditure was US$ 3218.36 in year 2017/2018 which was the lowest US$ 802.73 in year 2016/2017. The result showed that, people were willing to pay about US$ 0.26 in average to visit this religious forest. Around 2% of the respondents were willing to pay amount US$ 4.2 while 5% of respondents stated that they were willingness to pay US$ 0.16 to visit this religious forest. The benefit cost ratio (B/C) was the highest about 3.63 in 2013/2014 but this was the lowest only 0.5 in 2011/2013. The principal component analysis showed that illegal harvesting, drugs users in the forest, air and water pollution, landslide, flood and erosion, improper management were positively correlated with each other whereas grazing, fire and firewood collection were negatively correlated with each other. This finding will be useful for decision maker to manage religious forests.

Key words: Economic valuation, forest ecosystem, income and expenditure

1. INTRODUCTION

Forest resource is one the important entity in Nepal. The report of forest resource published by Forest Research and Training Centre showed that there is 6.4 million ha in Nepal (MFSC, 2017). Based on this report there is about 982.3 million m^3 growing stock in Nepal in total and average growing stock is 164.8 m^3 /ha. Specifically, the average growing stock of High Mountain, Middle Mountain as well as Terai and Chure was 225.2, 124.26 and 161.66 m^3 /ha respectively (MFSC, 2017). Nepal is rich in forest resource so the contribution of forestry sector in

Gross Domestic Product was 3.5% in 2000 which was 4.4% in 1990. However, the role of forestry sector has been changing according to time period (MICS, 2001).

The forest protection was the major focus of the forest management practice in Nepal in the past but the priority has changed according to time period. This priority is generally shifting toward the eco-tourism particularly in urban and suburban area. The religious forest is one of the examples of forest management practice in Nepal. The main purpose of the religious forest was to meet the forest products demands of religious group but these days the aim of religious forest is changing. Generally, urban people use the religious forest as recreation and eco-tourism purpose. The eco-tourism and recreation activities are the handsome source of income of the religious forest and people living nearby (Mills et al. 2002; Agustino et al., 2011; FAO, 2011). The religious forest has social, cultural and economic importance (DOF, 2005, Shrestha, 2002, MoF, 2001).

Religious forest is a good source of income especially in urban area. Bajrabarahi religious forest is one of the good sources of income of local users (Gumartini, 2009). There are several sources of income of the religious forest and one of the important income sources is ecotourism. The income generation and expenditure items are the major component of economic analysis. Religious group of Bajrabarahi religious forest has been generating handsome source of income but the research particularly related to economic analysis of the religious forest has not so far studied. Moreover, there are factors affecting the management of religious forest. However, study regarding this is lacking. Thus, this research was carried out aiming to assess the trend of income and expenditure of religious forest and cost benefit analysis. Another important objective of this research was to show the factors affecting the management of religious forest.

2. MATERIALS AND METHODS

Study site:

Bajrabarahi religious forest is selected as the study site for this. The longitude and latitude of the religious forest is 27.6576° N, 85.1220° E and area of this forest is 18.29 ha. The altitude ranges form 1324-2300 meters of Lalitpur district. The climate here is subtropical dominantly so the sub- tropical type of forest species is found in the religious forest. *Pinus roxburghii, Schima wallichii, Pinus roxburghii, Alnus nepalensis, Lagerstroemia parviflora, Castanopsis* spp., *Lagerstroemia parviflora* are the major tree species in the forest.

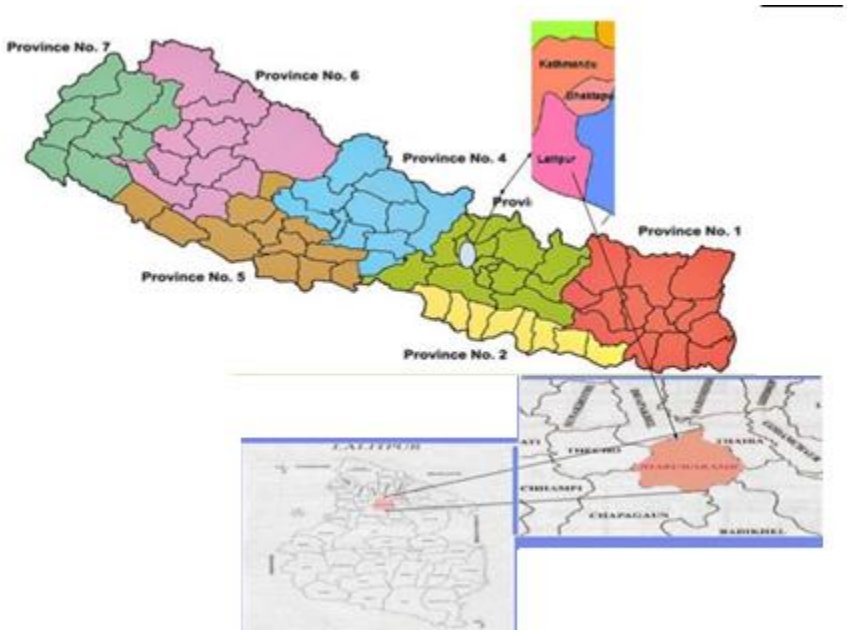

Figure 1: Map of Nepal showing study area

Data collection:

Primary data were collected through observation dated from 20 to 25 March, 2021, focus group discussion (on 30 March and 2nd May, 2021) and Key informant interview.

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Key informant interview:

Total 10 key informants representing the local people in terms of their ethnicity, social status, knowledge, economic well- being and ecological regions were carried out. For this the check list was prepared which includes the main source of income and expenditure items as well as the challenges of religious of forest management.

Focus group discussion:

Two focus group discussions were carried out with the executive members of religious forest. The check list was prepared to know about trend of income and expenditure as well as the management challenge of the forest.

Direct non - participatory observation:

Field observation was carried out to collect the data related to challenge of forest management of religious forest. The observation was extended to gather information regarding the services provided by the forest, existing land use and resource use pattern and their impacts on the forest management.

Questionnaire survey:

Semi- structured questionnaire was prepared to collect the information about willingness to pay to visit the forest. So, the people perception about the willingness to pay to visit the forest was collected interviewing with 60 visitors.

Secondary data collection:

Secondary information was carried out from the audit report. Data of 2012 to 2018 showing the income and expenditure were collected to show the income and expenditure trend to show cost benefit analysis.

Data analysis:

Economic and statistical analyses were performed to analyze the collected data. The trend analysis of income and expenditure was conducted. Similarly, the economic analysis like B/C ratio and willingness to pay was calculated. The Fisher's exact test was applied to evaluate the significance of willingness to pay to visit Bajrabarahi religious forest. The factors affecting the management of religious forest were analyzed using the principal component analysis.

3. RESULTS

Trend of income of Bajrabarahi religious forest:

Figure provides the information about income generated in Bajrabarahi religious forest from year 2012 to 2018. Sources of income in forest include parking, shooting spots, boards and floors, business help. The highest income was US$ 7191.17 in year 2017/2018 which was the lowest US$ 4520.96 in year 2012/2013. The trend of income was increasing every year (Figure 2).

Trend analysis of expenditure of Bajrabarahi religious forest:

Figure 3 provides the information about expenditure of Bajrabarahi religious forest from year 2012 to 2018. The highest expenditure was US$ 3218.36 in year 2017/2018 which was the lowest US$ 802.73 in year 2016/2017. Expenditure items were meeting allowances, health program, forest management expenses, blood donation, trust and building development. Expenses were decreasing for few years in 2013 to 2016 but was increasing lately (Figure 3).

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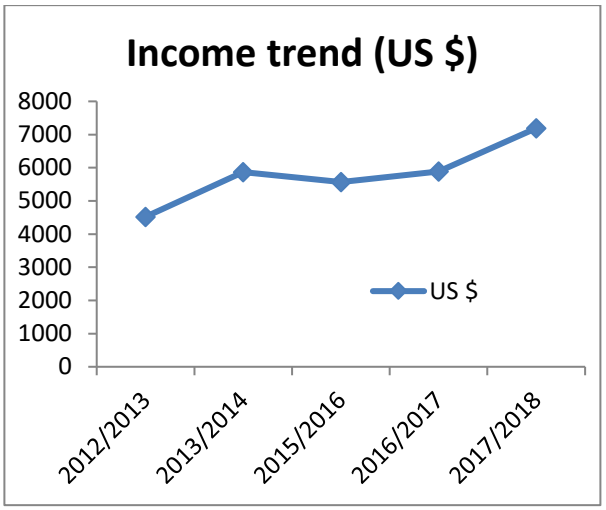

Figure 2: Trend of income of BBRF

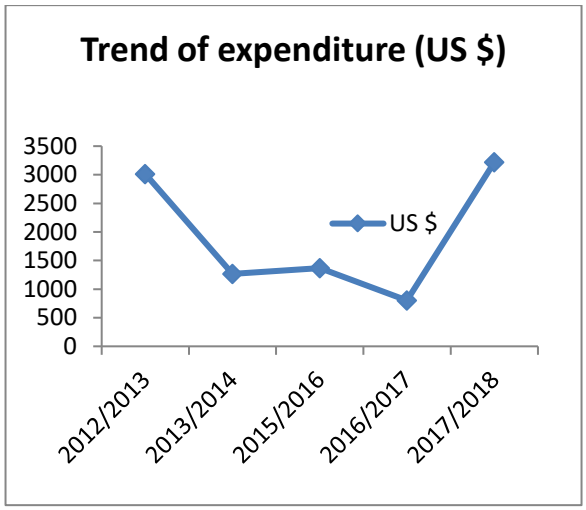

Figure 3: Trend of expenditure of BBRF

Cost benefits analysis:

Table 1 indicates the benefit cost ratio from year 2012 to 2018. As the presented value shows a positive benefit cost ratio (the total benefits from the forest was greater than the total cost) the management committee spent for the protection and management of the forest. The B/C ratio was the highest about 3.63 in 2013/2014 while this was the lowest 0.5 in 2011/2013.

Table 1: Cost benefit ratio

Year	B/C Ratio	Remarks
2012/2013	0.5	
2013/2014	3.63	
2015/2016	3.06	
2016/2017	6.3	
2017/2018	2.1	

Correlation between the variables and frequency of visit: The table 2 shows the association of different variables with the frequency of visit. Since, the P-value of gender was below 0.05 it was the significant association with visit but the P- value of education and age was above 0.05 they weren't associated with visit.

Table 2: Estimated result of P-value:

Variables	Fisher exact test	P value
Gender	0.064	0.034
Education	0.671	0.347
Age	1.000	0.744

Recreational value of Bajrabarahi religious forest:

Till date there isn't any entry fee for Bajrabarahi religious forest. The table 3 indicates that around 70% of the respondents were willing to pay for the improved condition of the forest. The average amount they were willing to pay was US$ 0.26. Around 2% of the respondents were willing to pay maximum amount i.e. US$ 4.2 and minimum amount was US$ 0.16 willing to pay by 5% of respondents (Table 3).

Table 3: Recreational value of Bajrabarahi religious forest:

SN	Willingness to pay (in us $)	No of people	Percent
1	1.68	4	6.60%
2	1.26	3	5%

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3	0.42	17	28.33%
4	4.2	1	2%
5	0.16	3	5%
6	2.1	2	3.33%
7	0.25	3	5%
8	0.84	4	6.60%
9	0.21	5	8.33%

(Field survey 2021)

Factors affecting Bajrabarahi religious forest:

The result showed that there were eight major factors affecting the ecosystem services of forest. These factors were: Illegal harvesting, Drugs, Pollution, Landslide, Flood/Erosion, Improper management, Grazing, Fire and Firewood collection (figure 4).

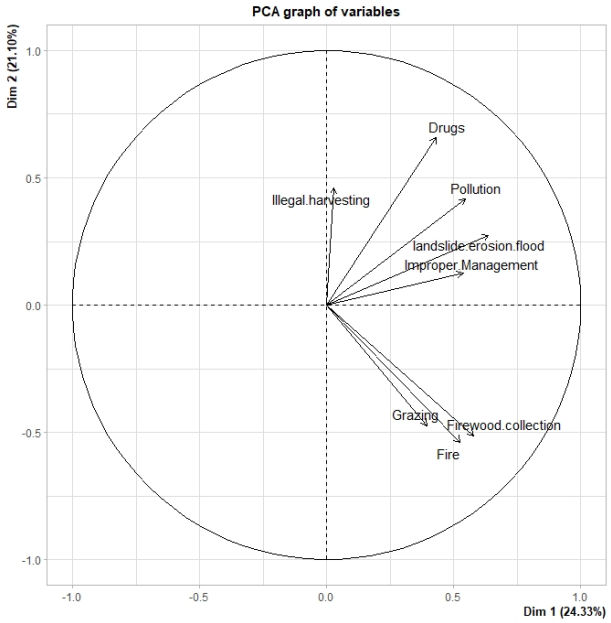

Figure 4: PCA graph showing factors affecting Bajrabarahi religious forest

4. DISCUSSION

It is undeniable fact that all individuals have values; attitudes, motivations and judgments (Rai & Fiske, 2011, Nelson, 2020). Often, it is believed that, the people's characteristics are determined based on their religious faith and beliefs (Ashiwa, 2020). The religious forest and protected forest are good source of spiritual knowledge (Dudley et al., 2009). This spirituality people feel in Bajrbarahi religious forest. About over 80 percent people rationalized that religion is a powerful tool which remarkably influence the human behavior and they guide their life accordingly (Rappaport, 1979, 1999; Higgins, 2011). However, they change their behavior and characteristics and attitude as well. One of the important behaviors is to participate in religious activities, to visit the religious place and spend the time there. They feel peace and enjoyment so they are willing to pay to visit the religious place (Posas, 2007; Leiserowitz, 2006). Bajrabarahi religious forest is one of the attractive place where people like to visit and spend hours to find the peace and prosperous.

Most of the religious place and forest is recognized as the eco-tourism place (Chandel, 2020, Bhaya, 2020). Thus, the opportunity of income is high in these palaces. Bajrabarahi religious forest is one of the good examples of it where the people will to visit and pay. The belief system is created and recognized in these religious places (Taylor, 1981). The religious place with forest is another source of attraction when local can generate the income. Therefore, Bajrabarahi religious forest is handsome source of income in Lalitpur, Nepal. Similar examples are Pasupatinath Religious Forest, Shwambhunath Religious Forest and so on (Shrestha et al., 2020, Huettmann, 2020). The attitudinal change big challenge in the world but the religious places and forests are importantly

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recognized for this (Petrova, 2014). Thus people will to pay to visit and spend the religious place like Bajrabarahi religious forest. However, there is big management challenge to protect such religious forest.

There are several factors affecting to manage Bajrabarahi religious forest. Some important reasons are illegal harvesting, air and water pollution, landslide, flood/erosion, improper management, grazing, fire and firewood collection. In addition, some addicted people come here to use the drugs as well. These challenges are serious management other religious forests (Sandholz, 2016, Uprety, 2017, Dhyani & Dhyani, 2020).

5. CONCLUSION AND RECOMMENDATION

This religious forest provides mostly the cultural services where the visitors give the highest priority. The religious service, natural beauty or recreations are main source of income of this religious forest. Picnic fee, parking, shooting spots, boards and floors are the main sources of the income. The trend of income was increasing in the forest and the trend of expenditure was also varying. However, religious forest in urban and semi-urban areas is becoming handsome source of income for local people. Illegal harvesting, Drugs, Pollution, Landslide, Flood/Erosion, Improper management, Grazing, Fire and Firewood collection are factors affecting the forest management. Thus, management committee needs to address these issues properly to promote the forest for income generation for local community.

Funding

This study has not received any external funding.

Conflicting interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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